

The performance of a single-cylinder diesel engine fuelled with egusi based biodiesel

ABSTRACT

The rapid depletion of fossil fuels coupled with the awareness of environmental issues and escalation of petroleum prices have led to intensive efforts in the search for renewable and environmentally friendly alternative fuel. Biodiesel is one such fuel. The main objective of this study is to evaluate the performance and emissions characteristics of a single-cylinder diesel engine fuelled with egusi biodiesel and compared against the conventional diesel and palm oil based biodiesel available in the Malaysian market. The oil extraction from whole Egusi seeds is obtained through Soxhlet extractor and went through transesterification process. The egusi based biodiesel is prepared for B7 (7% egusi biodiesel, 93% diesel) so that a direct comparison can be made against the palm oil based biodiesel sold in the market (grade B7). A single-cylinder, four-stroke diesel engine with speed of 1200-2000 rpm is used to evaluate the engine performance. Egusi based biodiesel shows a comparable engine performance to that of conventional diesel and B7 palm oil. B7 Egusi oil reduces carbon dioxide (CO₂) and carbon monoxide (CO) by 0.8-0.9 %, while unburnt hydrocarbon (UHC) and nitrogen oxides (NO_x) by 75-80 % from that of diesel. It shows that the Egusi based biodiesel holds the potential as a biodiesel feedstock in the future.

Keyword : Single-cylinder; Diesel engine; Egusi